MONTANA UNDERGROUND STORAGE TANK PROGRAM NEWSLETTER

MUST News

Department of Environmental Quality Spring Issue 2004

Thirty Years and Counting:

Case history of a lingering vapor threat

Blaine County Museum's basement sump before remediation work.

An old service station in Chinook, Montana, operated underground storage tanks from the 1960s to the 1990s. In May 1998, the owner notified the Montana Department of Environmental Quality that the two USTs were empty and not in use. DEQ imposed a series of deadlines to remove the USTs and associated piping. The deadlines were not met, and an administrative order was issued to properly close the UST system. A release was suspected at the facility based on the age of the USTs and anecdotal discussions with the owner.

In July 2003, DEQ LUST Trust and its contractor, Tetra Tech EMI (TTEMI), went on site to remove the two USTs. Contaminated soil with hydrocarbon odor and staining was encountered from one to two feet below ground surface, extending below the bottom of the USTs as deep as 12-to-13 feet below ground surface. Additionally, a third UST was discovered. After discussions with the owner, it was assumed that the third tank had developed leaks and subsequently was closed in-place in the 1970s. During the soil removal activities, a local resident alerted TTEMI that

New containerized sump with pump brings improved air quality.

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there had been instances where the Blaine County Museum across the street had to close its basement exhibits because of strong hydrocarbon odors. TTEMI inspected the museum basement. Although vapors were not present at that time, TTEMI discovered a sump in the basement that could serve as a conduit for vapors. TTEMI notified the DEQ LUST Trust of the complaint of historical vapor issues.

After phone conversations with museum staff and neighboring residents, Aaron Anderson of the DEQ LUST Trust visited the site August 7, 2003. The former service station sits on the northeast corner of an intersection. The service station does not have a basement. The museum is on the southwest corner. There is a church with a basement on the northwest corner, and a funeral home with a sump on the southeast corner. All three basements were inspected. The sump in the museum was located in a room in the northeast corner of the basement. Vapors were noticeable in this sump room. The basement in the church was much shallower than the museum and it did not have a sump. No vapors were readily apparent in the church. The basement in the funeral home had a sump, but no vapors were readily apparent. Water samples were collected from the sumps in the museum and the funeral home. In addition, air samples were collected using SUMMA canisters. The SUMMA canisters had an air intake regulator that enabled the vapor sample to be collected over a 24-hour period. SUMMA canister samples were collected in the sump room in the basement of the museum, on the main floor of the museum, in the basement of the church, and in the basement of the funeral home near the sump.

Results

The water sample from the museum sump contained benzene at 181 parts per billion (ppb). The WQB-7 Risk Based Screening Level for benzene is 5 ppb. The air sample from the SUMMA canister detected benzene concentrations at 5.7 ppb by volume. The air sample on the main floor of the museum did not detect any vapor concentrations, as did the air sample from the basement of the church. The vapor sample from the funeral home reported some constituents but they appeared to be the result of various solvents and household cleaners in that basement, or other chemicals related to the business. Benzene was not detected in the funeral home basement, and the water sample collected from the sump did not exhibit any hydrocarbon contamination.

Based on the field observations and analytical results, it was readily apparent that the museum had vapor impacts from the petroleum contamination stemming from the former service facility across the street. The primary corridor for vapor intrusion was through the sump in the basement. The basement had concrete walls and floors, and there were no noticeable cracks or leaks, other than a few rooms that were musty. However these rooms did not exhibit any petroleum odors. The sump was located in a small room in the northeast corner of the museum basement. The sump room is approximately ten feet long and six feet wide. The museum had installed a bathroom-type exhaust fan in the sump room that vents to the exterior of the building to help evacuate the gasoline vapors. However this fan was not explosion proof, presenting an additional liability.

A decision was made to isolate the sump from the rest of the building to mitigate the vapors from the sump. Vapor mitigation measures were conducted in August and September of 2003 by TTEMI. The sump was isolated by covering it with a small rubber enclosure that was sealed to the floor around the sump. An explosion proof fan vented the enclosure. Vented vapors were discharged through an exhaust stack that extended above the museum roof. After the sump was isolated, additional vapor samples were collected from the sump room, from another room within the basement, and again from the main floor. All vapor sample results were non-detect, indicating that the isolation of the sump alleviated the majority of the vapor intrusion.

Since then, DEQ-LUST and TTEMI have completed a Phase I Remedial Investigation that partially defined the extent and magnitude of groundwater contamination. The next phase of work will completely define the extent and magnitude in an effort to define potential receptors. Several nearby residences have been contacted and so far none has noticed any vapors within their basement. Once

Thirty Years and Counting – *continued from page 2*

the potential receptors have been defined, additional vapor samples will be collected from their basements to confirm that there is not an ongoing problem. In addition, vapor samples will continue to be collected from the museum basement, especially during high groundwater conditions to confirm that there are no other pathways into the basement other than the isolated sump.

The vapor mitigation measures in the museum are only the preliminary step in mitigating the risk to human health from the dissolved-phase gasoline plume. Although the sump has been isolated and 200 cubic yards of contaminated soil have been removed, a large secondary source still exists underneath the former service station and the intersection between it and the museum. Once the extent and magnitude of contamination is defined and all the potential vapor threats investigated, considerations will be made to address the remaining source-zone contamination. This may involve additional soil removal or some other in-situ remediation.

The lesson

This vapor issue serves as a valuable lesson. Although the majority of the petroleum release from the service station probably occurred 30 years ago, the release was only confirmed last year. The release was substantial enough to expose people in a public building to benzene levels above the target indoor air concentration. Once a release is confirmed, it is important to immediately investigate and mitigate any potential exposure to human health and the environment.

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Thamke at Helm of New Waste and Underground Tank Management Bureau

Ed Thamke has been named chief of the new Waste and Underground Tank Management Bureau within the Permitting and Compliance Division of the Montana Department of Environmental Quality.

Besides the underground storage tank program, the new bureau is responsible for five other permitting and regulatory programs: asbestos, hazardous waste, solid waste, junk vehicles, and septic pumpers.

Ed has a degree in geology from the University of Iowa and worked in mining and exploration prior to going to work for one of DEQ's predecessor agencies, the Montana Department of Health and Environmental Sciences, in 1991.

Ed's initial experience in state government was in licensing and regulation of solid waste management systems. Most recently, Ed was chief of the Complaint Management Section of DEQ's Enforcement Division, responsible for the agency's response to citizen complaints, spills, and methamphetamine issues.

Ed lives in Helena with his wife, Joanna, a hydrogeologist for the Unites States Geological Survey, and their two children, Irene and Clara. The Thamkes are avid outdoor recreationists and active in church and community activities.

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Meet Joe Murphy

Here is another in a series of brief articles introducing members of the Montana Petroleum Tank Release Compensation Board. Previous issues of MUST News have presented articles on Barry Johnston, chairman, and Daniel Manson, vice chairman.

Joe Murphy, 39, of Great Falls is a Montana native – a graduate of Cut Bank High School and Montana State University-Bozeman.

At MSU, Joe earned a degree in civil engineering in 1988 and was immediately employed by Neil Consultants, Inc. He became vice president and partner in the firm in 2001.

Joe and his wife, Janell, have three children: Braden , 8, Brynn, 5, and Morgan, 3.

Joe's hobbies are golf, swimming, tennis, and coaching youth sports.

As a member of the PTRC Board, Joe's goals are simplifying the claims process, remove unnecessary expenditures, and develop stronger relations and better communication between consultants and the board and its staff.

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Terms End June 30 for 3 PTRC Board Members

Montana's Petroleum Tank Release Compensation Board membership has been established on a rotating schedule. Three of the seven board members are serving terms that will be expiring this summer.

The law sets staggered terms for board members and requires representation of various public and industry interests. Appointments to the board are made by the governor.

Board members Joe Murphy of Great Falls, Gary Basso and Greg Cross, both of Billings, are serving terms that expire June 30, 2004.

Mr. Murphy was appointed as a representative of the petroleum services industry or a representative of the petroleum-release, remediation-consultant industry, Mr. Basso represents the insurance industry, and Mr. Cross represents the independent petroleum marketers and chain retailers.

Anyone who qualifies for one of these three positions and is interested in joining the board is encouraged to express that interest in a letter to the governor. Your communication should explain why you think you would be a good member and what you believe you could contribute to the board's work. Attach a resume or include background information in your letter, including your complete mailing address and home and office telephone numbers.

Address the letter to:

Governor Judy Martz
Attn: Susan Ames
State Capitol, Helena, MT 59620.

Submit by early-to-mid-June for consideration. For additional information contact the Governor's Board & Commission advisor at (406) 444-3111, or visit their website at **http://discoveringmontana.com/gov2/css/vacancies/vacancies.asp.**

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The Quest for the Perfectly Reliable LLD, or...

Should Electronic Line Leak Detectors Have an Annual Test of Operation?

This article is reprinted and abridged in MUST News by permission of the author and the publishers of LUSTLine. The full article originally appeared in LUSTLine Bulletin 36 and can be viewed in its entirety on the DEQ Web site at ***http://www.deq.state.mt.us/UST/MUSTnews.asp***

By Marcel Moreau – Marcel Moreau is a nationally recognized petroleum storage specialist whose column, Tank-nically Speaking, is a regular feature of LUSTLine. If there are technical issues that you would like to have Marcel discuss, let him know at marcel.moreau@juno.com.

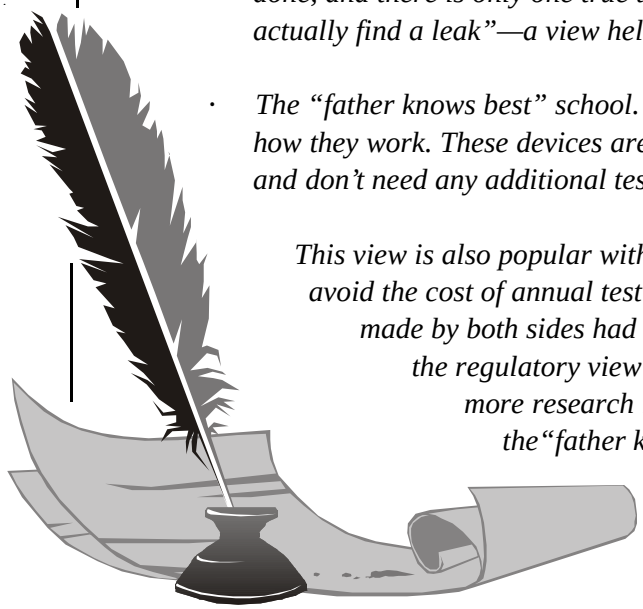
"My first encounter with the electronic line leak detector (ELLD) "test of operation" issue came a few years ago during a compliance inspection. The recordkeeping at the facility was pretty good, but there was no record of an annual test of operation of the ELLD. The maintenance person said that he had checked with the manufacturer to obtain test procedures and had been told that the device did not need to be tested.

At the time, this statement seemed to me to be a bit presumptuous on the part of the manufacturer. Nevertheless, the rules did say that test procedures were to be performed "in accordance with the manufacturer's requirements," so the manufacturer did seem to have some ground to stand on.

I have since heard the question, "Do electronic line leak detectors need to be tested?", many times from inspectors and have followed discussions concerning the issue with Internet interest groups. There are two main schools of thought on the issue:

- *The "proof is in the pudding" school. This view holds that, "The rule says a test should be done, and there is only one true test of operation and that is to see if the device can actually find a leak"—a view held primarily by regulators.*
- *The "father knows best" school. This view holds that, "I build these things and I know how they work. These devices are pretty smart, can tell when they are not working right, and don't need any additional testing"—a view held primarily by some manufacturers.*

This view is also popular with UST owners who have invested in ELLDs, in part, to avoid the cost of annual testing of mechanical devices. Although I believed the points made by both sides had some validity, my own tendency has been to lean toward the regulatory view of "the proof is in the pudding." Having done a little more research into the matter, however, I am beginning to lean toward the"father knows best" school."



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The Quest for the Perfectly Reliable LLD - *continued from page 5*

The Electronic LLD and the Testing Issue

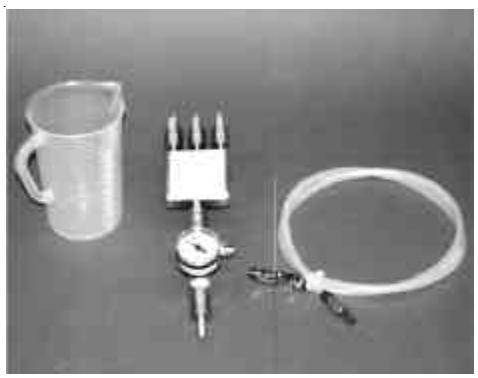
For its first 30 years, the LLD remained an entirely mechanical device. Changes came with the implementation of federal rules. Now LLDs are considerably more sophisticated than the original mechanical models and rely on electronic components. Although mechanical devices (MLLDs) are still common, the ELLDs are making headway in the marketplace.

Annual testing of MLLDs has long been a requirement in fire codes. Testing of MLLDs is fairly straightforward. Because all working parts are concealed and the MLLD is self-contained, there is no way to test it other than to generate a leak and see if the MLLD responds. Typically, testing involves connecting a device into the piping system crash valve at the base of the dispenser. The testing device typically includes pressure gauges and a small valve that can be adjusted to allow three gallons per hour (gph) of product to leak into a container.

The "test-of-operation" issue, however, becomes more complex with ELLDs. These devices are usually capable of conducting more accurate 0.2 or 0.1 gph tests, in addition to the 3 gph test. Because the federal definition of a line leak detector is written as a performance standard (detecting 3 gph leaks at 10 psi in one hour), the annual test of operation of LLDs applies to only the 3 gph function of ELLDs. There is no requirement in the federal rules to evaluate the ability of the ELLD to detect leaks of 0.2 or 0.1 gph on an annual basis.

The Question Please...

The debate concerning ELLD test procedures boils down to this point: many regulators want to continue the tradition of testing an operation by generating leaks and seeing if they are detected; some manufacturers insist that their ELLDs are completely self-testing and need no additional evaluation. Not all manufacturers claim that their ELLDs are self-testing. In fact, some state that the test of operation should consist of generating a leak and verifying that it is detected. We need to understand a little more about the operating principles of ELLDs and the types of "self-testing" they are capable of conducting.



Types of ELLDs and How They Work

There are two types of ELLDs: flow-based and pressure-based. Both types attempt to evaluate the integrity of the piping immediately after each customer has finished dispensing the product. The test may require from less than a minute to 10 minutes to complete. If another customer arrives and turns on the pump, the test is aborted and restarted.

In general, both types of ELLDs have the ability to turn the pump on and off and to communicate in the form of displays and/or printers. They also have some computational and/or logic circuitry that can determine if a piping run is tight and evaluate, to some degree, how well the ELLD itself is functioning.

Much more interesting and valuable information is contained in the full, unabridged article by Marcel Moreau. It can be read or downloaded from the DEQ Web site at http://www.deq.state.mt.us/UST/MUSTnews.asp. The full article has details on:

- Pressure-Based ELLDs; the most common type of ELLD
- How Pressure-Based ELLDs Test Themselves; no question they can do some self-testing
- Flow-Based ELLDs; after the customer hangs up the nozzle
- How Flow-Based ELLDs Test Themselves
- The Answer . . .
- For Pressure-Based ELLDs
- For Flow-Based ELLDs
- For Those Who Are Still Dissatisfied
- My Two Cents

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Keeping in Touch with DEQ and the Petro Board

DEQ's recent reorganization and office relocations resulted in many new phone numbers and office addresses. Here's an up-to-date list of people in the cleanup (remediation), permitting, and compensation offices of the Montana underground storage tank programs and how to contact them. Note many telephone prefixes changed to 841- from 444-.

The law requires immediate report of a tank release: 1-800-457-0568

Remediation Division

1100 North Main (Old Armory)
Mail: PO Box 200901
Helena, MT 59620-0901
Fax: 841-5050
Phone (*general information*): 841-5000

Sandi Olsen, Division Administrator
Phone: 841-5001
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Hazardous Waste Site Cleanup Bureau

Mike Trombetta, Bureau Chief
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(Including Leaking Underground Storage Tank Program)

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Keeping In Touch With DEQ And The Petro Board - *continued from page 7*

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New Tank Rules in Effect

Eight new rules affecting operation and maintenance of underground storage tanks have been in effect for the past four months.

Briefly, here's what the new rules do:

1) Replace the term "temporarily closed tank" with the term "inactive tank" with one significant difference. Not only must the tank be out of use, but the department must be notified in writing that the tank is out of use. The tank is considered active and must have a valid operating permit until the department has written notification that the tank is out of use.

2) Add several inspection-related violations to the penalty table.

3) Require that a non-compliant tank be emptied.

4) Allow compliance tags (not operating tags, but the old single-colored aluminum tag) and compliance certificates to be discarded as they are no longer needed to show compliance with 1998 upgrade requirements.

5) Establish timeframes for corrective action after a compliance inspection: 60 days for leak-detection violations, 90 days for all others. A follow-up inspection must be conducted within 30 days of completion of the corrective action.

6) Allow inactive tanks to be returned to service as well as permit new installations under conditional operating permits. Various processes are spelled out in the new rules for returning inactive tanks to active status. Variables affecting the requirements are: 1) whether the facility has a valid operating permit; 2) whether the tank has been inactive for over 12 months; and 3) whether corrosion protection can be documented for the inactive period.

7) Raise tank fees to support the program.

8) Clarify that both the purchaser and the seller of an underground storage tank facility are responsible for notifying the department when ownership changes. The seller is responsible for fees until the department is properly notified.

Complete text of the new rules can be found on the DEQ Web site:
http://www.deq.state.mt.us/dir/legal/Chapters/Ch56-toc.asp

The new rules became effective December 12, 2003. They were written to implement sections of state law enacted by the 2003 Montana Legislature.

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Spills and Overfills Cause Most Storage Tank Releases

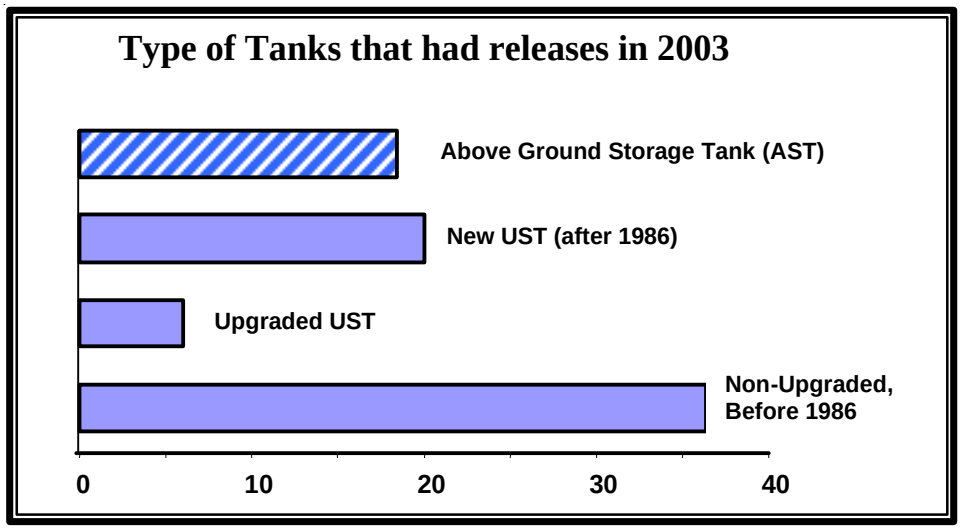
What causes tank releases in Montana?

The Department of Environmental Quality recorded 81 new releases in 2003. The vast majority, or 43%, of releases came from old underground storage tanks (USTs) that did not meet the 1986 federal new tank standards mandated for all USTs by December 22, 1998.

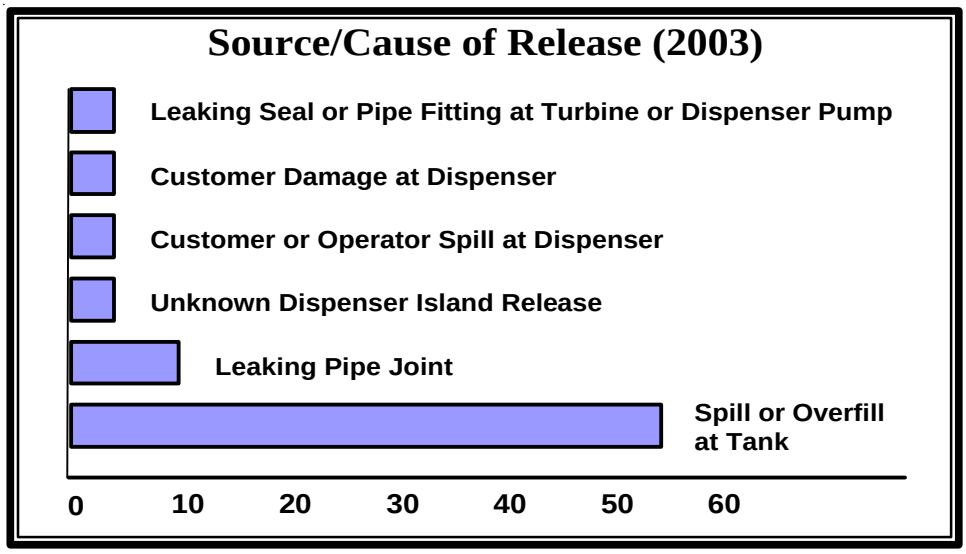
Many of these tanks were discovered through construction activities or environmental site assessments conducted at the property, and the owners discovered releases when the USTs were removed.

Nearly all of the releases reported for non-upgraded USTs (33 of 37 total) included "spill or overfill at tank" as the cause of the release. This is not surprising as most pre-1986 USTs did not contain overfill prevention that was mandated for all USTs after 1998.

"Spill and Overfill at tank" accounts for the major cause of releases in 2003. Non-upgraded USTs and above-ground storage tanks (ASTs) may skew the data because overfill protection is not required for these types of tanks as it is for new and upgraded USTs. Even after removing ASTs from the autopsy data, spill and overfill at tank still accounts for 31 percent of all releases discovered from new and upgraded USTs last year.



Possible reasons for these spill and overfill releases may be related to contamination present in the soil before the new tanks were installed or the old tanks were upgraded, and to the failure of early-design friction-fit spill containment buckets.

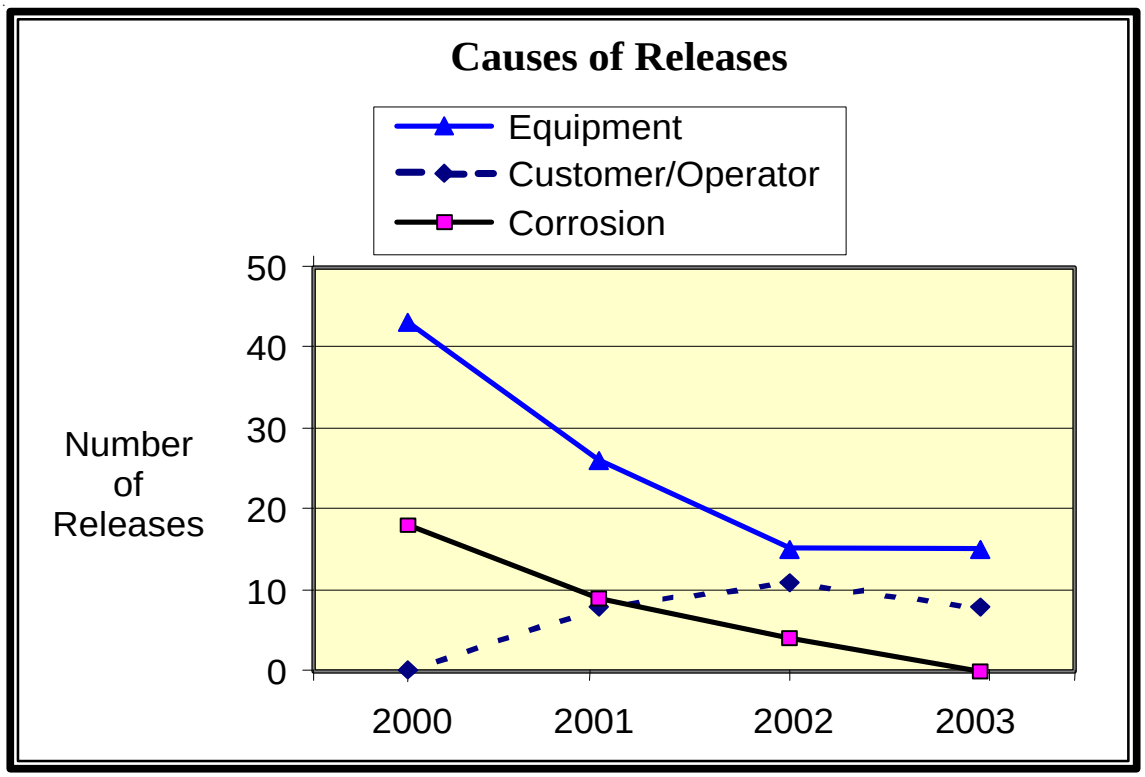


The most alarming trend indicates that customers caused seven of the twenty-six releases reported from new and upgraded USTs last year. That is over a quarter of all releases reported from this type of tank. Seven releases were also reported as leaky pipe joints and pump seals in these new and upgraded tanks.

Surprisingly, not a single release was attributed to corrosion holes in the tanks or piping last year. This includes all eighty-one

Spills and Overfills Cause Most Storage Tank Releases - *continued from page 10*

releases. This is compared to four corrosion holes accounting for releases in 2002, nine in 2001, and eighteen in 2000. The four-year trend shows a strong decrease in the number of releases caused by corrosion — even in non-upgraded USTs. The four-year trend also shows a general decrease in equipment failure.



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Web Hoax Alarms City Over Water

Officials in a California city recently became alarmed about the potentially dangerous properties of dihydrogen monoxide.

According to an Associated Press report, officials in the Orange County city of Aliso Viejo even considered banning the use of foam cups when they learned that the chemical was used in their production.

Then they learned that dihydrogen monoxide, H2O for short, is the scientific term for water.

A paralegal for the city apparently had fallen victim to one of many official-looking Web sites operated by pranksters to describe dihydrogen monoxide as "an odorless, tasteless chemical" that can be deadly if accidentally inhaled.

The City Council had gone so far as scheduling a vote on a proposed ordinance that would have banned the use of foam containers at city-sponsored events. The proposed ordinance carried an explanation that the ban was in order because the foam cups were made with a substance that could "threaten human health and safety."

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